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Anaconda Reclamation

December 12, 1978

The Honorable Floyd R. Correa
Governor, Pueblo of Laguna
P.O. Box 194
Laguna, New Mexico 87026

Dear Governor Correa:

In accordance with the discussion at the November 28 meeting in albuquerque, Anaconda's Environmental Department has put together a report of the testing and monitoring conducted by the company at the mine site. Enclosed is a copy of the report.

Also enclosed is a copy for your file of the material on Radiation Monitoring and Control, which was given to Bill Haltom at the November 28 meeting.

If you need further information or clarification, please let us know.

Sincerely,

Mary J. O'Neill

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Enclosures

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The welfare of the worker and the surrounding environment is of prime concern to The Anaconda Company. Numerous monitoring programs are presently in effect to insure a watchful eye on the occupational and general population environment. The following discusses monitoring programs for the underground and the open pit mining operations. Also presented is a discussion of studies The Anaconda Company is presently participating in.

Radiation Monitoring and Control

Underground air samples are taken at least once a week at every working area to check for radon daughter concentrations. Radon daughters are the four short lived elements which succeed radon in the U-238 decay series. These include PO-218 (RaA), Pb-214 (RaB), Bi-214 (RaC) and PO-214 (RaC^1). Working areas sampled include: drill positions, slusher positions, access drifts, shops, lunchrooms, haulages, and all areas underground through which employees may pass. About 3,000 samples per year are taken at the P-10 Mine and cover an average of 32 working areas. (July 1978--26 stopes and 6 haulage development.)

Regulations do not allow any employee to work in radon daughter concentrations above 1.0 working level. It therefore becomes necessary to know the concentrations in all active work areas. A working level (WL) is an atmospheric concentration of radon daughters (Rn 222) which will deliver 1.3×10^5 mev (million electron volts) of alpha energy per liter of air in decaying RaC^1 (PO-214).

The total employee exposure to radon daughters allowed is four (4) working level months (WLM) per calendar year. A working level month (WLM) is an exposure equivalent to one (1) working level of radon daughters for 173 hours or 173 working level hours (WLH). A working level hour (WLH) is an exposure equivalent to one working level of radon daughters for one hour. One hundred seventy-three (173) is the average amount of hours a person works in a month.

In order to maintain the 4 WLM limit a person cannot work over a .33 WL average throughout the year--173 hours x .33 WL = 57.07 WLH ÷ 173 = .33 WLM x 12 months = 3.96 WLM for the year. Therefore, we must maintain our exposure average under .33 WL and cannot work anyone over 1.0 WL. The working level averages for 1977 at the P-10 Mine were: Stopes - .23 WL; Haulages - Nil; Station Area - Nil; Mine Average - .16 WL.

Records of employee exposure to radon daughers are reported to the State Mine Inspection Bureau on a quarterly basis. The records are updated twice a month to insure that no person will exceed the 4.0 WLM annual limit.

Gamma radiation dosage is also recorded. This is accomplished by the use of TLD badges which are taped inside the hat of the miner and collected every month. Gamma surveys with the use of a geiger counter are also accomplished.

The TLD badges are collected and sent to Eberline Instrument Company in Santa Fe for reading. Gamma dosage is limited by regulation to 1250 MREM per quarter and 5000 MREM per year. A REM is the amount of ionizing radiation that, when absorbed by man, is equivalent to one Roentgen of x-ray or gamma radiation from Roentgen Equivalent Man. Any badge receiving 300 MREM or more in one period is reported to the New Mexico Environmental Improvement Agency by Eberline. The results of all the badges are reported to Anaconda's Environmental Department.

A current epidemiology study is being conducted on Grants-area uranium miners by Dr. Robert W. Buechley of the University of New Mexico. The Uranium Epidemiology Study was established in order to determine what, if any, effects radiation exposure has on the uranium miner in the Grants area. The Anaconda Company is one of the companies supporting the first years of funding the study which began officially on December 6, 1977. Representatives of the University of New Mexico Cancer Research and Treatment Center, under the

direction of Dr. Robert W. Buechley, began to establish a study group--miners who had worked underground one year or more. They began examining the mining, smoking and radon exposure histories of the miners. The background data base will enable the team to determine the cancer disease catalist and death risk attributable to current levels of exposure to radon daughters among Grants--area uranium miners.

The epidemiology study is still in the preliminary stage. Many years of work and research is needed in order to obtain reportable lung cancer findings. Bi-monthly progress reports and final reports will be prepared by the research group under the suspieces of Dr. Robert W. Buechley. It is the intention of the group that, if a full and further study seems feasible and needed, a proposal will be designed incorporating the knowledge gained in the preliminary study.

Diesel exhaust combustion generates gases which can be hazardous. Therefore, the ventilation engineer checks for carbon monoxide and nitrogen dioxide gases on the underground diesel engines. The allowable concentration of gases is also set by regulation. For carbon monoxide, 50 parts per million (ppm). For nitrogen dioxide, 5 ppm. To insure this, an exhaust check is required as part of the weekly maintenance.

Environmental Monitoring

The Anaconda Company is presently engaged in an environmental monitoring program at the Jackpile-Paguate Mine.

Air particulate samples are collected by means of two high volume air samplers located just south of Paguate between the Village and the mine. Sampling is accomplished monthly and the samples are analyzed for Uranium-Nat., Ra 226 and Th 230. The collected samples are also analyzed for Cu, Pb, Cd, Zn, V, Mo, As and Se. The air particulate sampling program will be expanded in January of 1979. Two additional

monitoring stations will be established at the Jackpile Mine for a total of four stations. The stations will be positioned at critical locations and will encircle the mine. Radon gas and air particulate will be sampled at each station. Radon gas is monitored monthly and air particulate will also be monitored on a monthly basis. The new program will be totally initiated as soon as all the utilities and equipment are available for use. Data will be submitted quarterly to the Geological Survey. At the end of the year an evaluation of the data will be submitted to the U.S.G.S.

Surface and ground water monitoring is of major concern to The Anaconda Company. Anaconda has recently modified its water monitoring program by adding three new stream monitoring locations - Rio Paguate just above its confluence with the Moquino; the Rio Moquino just above its confluence with the Paguate; and at the mouth of Oak Canyon Wash - to the four previously monitored - the Rio Paguate upstream from the mining area; the Rio Moquino upstream; downstream from the mining area and the Paguate Reservoir. Also included in the water monitoring program are four wells: Old Shop Well, New shop Well, Jackpile Well No. 4, and P-10 Mine Well. These locations were initially analyzed for Ra 226, Uranium-Nat., major chemicals HCO_3, CO_3CL, SO_4, Na, K, Ca, Mg, pH, TDS, and minor chemicals Hs, Ba, Cd, Cr, F, Hg, NO_3, Se, Cu, Fe, Zn, Pb, Mo, Ni, V, and PO_4. They are monitored monthly for Radium 226 and Uranium-Naturals and annually for the mentioned chemicals.

The water quality data is submitted in applicable units of the regulations to the United States Geological Survey at the end of each year.

The drinking water samples are monitored monthly for bacteriological contamination.

Past surveys have shown that water samples taken from the above locations meet federal and state standards. The EPA surveyed mining activities around the Grants Mineral Belt in 1975 to determine the impact of these operations on surface and ground water. Samples collected from the Rio Paguate, Rio Moquino and the Rio San Jose revealed radium concentration less than the radium standard.